Grade 12 A/L ICT · Lesson 7

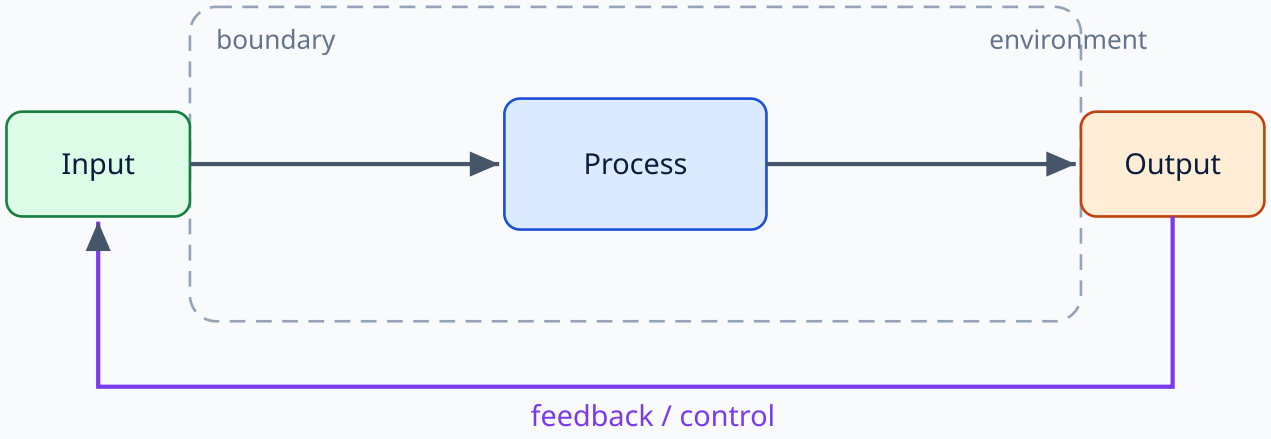
7.1 Systems Concept and Classification of Systems

Syllabus 7.1. A **system** is a set of related parts working together towards a common goal. You learn the **characteristics** of a system (input, process, output, boundary, environment, feedback, control) and **classify** systems as open/closed, natural/manmade and living/physical with examples.

1. What is a system?

A system takes **inputs**, **processes** them and produces **outputs** to meet a **goal**. A school, the human body and a supermarket billing system are all systems.

A system: input → process → output, with feedback and a boundary



Input–process–output with feedback and boundary

2. Characteristics

Boundary
Separates the system from its environment.

Environment
Everything outside that affects the system.

Feedback
Output information returned to adjust input or process.

Control
Compares output with goals and corrects the system.

3. Classification

Type	Meaning	Example
Open	Interacts with its environment	A business, the human body
Closed	No (or very little) exchange with environment	A sealed chemical reaction

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Natural	Formed by nature	Solar system, river
Manmade	Designed by people	Railway, banking system
Living	Has life processes	A plant, an ecosystem
Physical	Made of non-living tangible parts	A computer, a car

🧱 **Worked example: Classify a school canteen billing system.**
It is **open** (takes orders and money from outside), **manmade** and **physical**. Input = orders; process = price lookup and totals; output = bill; feedback = daily sales report used to change stock.

💡 Think of a thermostat: it measures room temperature (feedback) and switches the AC (control).

🚀 **Beyond the syllabus (2026 update)** *Not required for the exam – read for interest.* Digital twins in 2026 model a real factory or city as a live system with sensor feedback.

Key Words

System – Related parts working together to reach a goal.

Input – Data or resources entering a system.

Process – Changing inputs into outputs.

Output – Result produced by a system.

Boundary – Line separating a system from its environment.

Environment – Things outside a system that affect it.

Feedback – Output information sent back to adjust the system.

Control – Checking output against goals and correcting.

Open system – System that interacts with its environment.

Closed system – System with no exchange with its environment.

Manmade system – System designed and built by people.

Subsystem – A smaller system inside a larger system.

Sample Q&A

1. Define a system.

Answer: A set of related components that work together to achieve a common goal.

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2. List four characteristics of a system.

> **Answer:** Input, process, output, boundary (also environment, feedback, control).

3. What is feedback?

> **Answer:** Information about output returned to adjust inputs or processing.

4. Open vs closed system?

> **Answer:** Open systems exchange with the environment; closed systems do not.

5. Give a natural and a manmade system.

> **Answer:** Natural: solar system. Manmade: banking system.

6. What is a subsystem?

> **Answer:** A part of a system that is itself a system, e.g. the payroll in a business.

MCQ

1. A system is best defined as

A. any single computer part
B. a building with no people
C. related parts working towards a common goal
D. a list of random data
E. only a computer program

2. Which separates a system from its environment?

A. output
B. input
C. feedback
D. process
E. boundary

3. A business that buys from suppliers and sells to customers is

A. an open system
B. not a system
C. a living system only
D. a closed system
E. a natural system only

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4. Returning output information to adjust input is

A. storage
B. boundary
C. environment
D. feedback
E. encoding

5. The solar system is an example of a

A. manmade system
B. software system
C. natural system
D. transaction system
E. information system

6. A car is mainly a

A. natural system
B. physical system
C. living system
D. closed social system
E. abstract number

7. Control in a system

A. compares output with goals and corrects
B. removes all inputs
C. only stores files
D. prints the output only
E. deletes the boundary

8. A plant is classified as a

A. closed computer
B. manmade system
C. living system
D. physical machine
E. data file

9. Which term means: “Related parts working together to reach a goal”?

A. Control
B. Process
C. Manmade system
D. Environment
E. System

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10. Which term means: “Data or resources entering a system”?

A. Open system
B. Input
C. Output
D. Feedback
E. Subsystem

11. Which term means: “Changing inputs into outputs”?

A. Boundary
B. System
C. Closed system
D. Control
E. Process

12. Which term means: “Result produced by a system”?

A. Manmade system
B. Input
C. Open system
D. Output
E. Environment

13. Which term means: “Line separating a system from its environment”?

A. Feedback
B. Process
C. Closed system
D. Boundary
E. Subsystem

14. Which term means: “Things outside a system that affect it”?

A. Environment
B. Control
C. Output
D. System
E. Manmade system

15. Which term means: “Output information sent back to adjust the system”?

A. Feedback
B. Open system
C. Input
D. Subsystem
E. Boundary

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16. Which term means: “Checking output against goals and correcting”?

A. Closed system
B. System
C. Process
D. Environment
E. Control

17. Which term means: “System that interacts with its environment”?

A. Output
B. Open system
C. Feedback
D. Manmade system
E. Input

18. Which term means: “System with no exchange with its environment”?

A. Boundary
B. Control
C. Closed system
D. Subsystem
E. Process

19. Which term means: “System designed and built by people”?

A. Output
B. Manmade system
C. Open system
D. System
E. Environment

20. Which term means: “A smaller system inside a larger system”?

A. Boundary
B. Closed system
C. Input
D. Subsystem
E. Feedback

Structured Questions

1. Define a system and give two examples. *(3 marks)*

> Related parts working to a common goal; e.g. school; banking system.

2. Draw and label an IPO model with feedback. *(3 marks)*

> Input → process → output; feedback arrow from output to input; boundary around process.

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3. Distinguish open and closed systems with examples. *(2 marks)*

> Open exchanges with environment (business); closed does not (sealed reaction).

4. Explain the role of control and feedback. *(3 marks)*

> Feedback reports output; control compares with goals; adjusts inputs or process.

5. Classify a school canteen billing system. *(5 marks)*

> Open; manmade; physical; inputs orders; output bills.

Summary

- A system has parts working to a goal.
- Input, process, output, boundary, environment.
- Feedback and control keep it on track.
- Open or closed; natural or manmade.
- Living or physical systems.

MCQ answer key – 7.1

1. **C** – Goal-directed parts.
2. **E** – Boundary.
3. **A** – Interacts with environment.
4. **D** – Feedback.
5. **C** – Natural.
6. **B** – Physical.
7. **A** – Compare and correct.
8. **C** – Living.
9. **E** – System – Related parts working together to reach a goal.
10. **B** – Input – Data or resources entering a system.
11. **E** – Process – Changing inputs into outputs.
12. **D** – Output – Result produced by a system.
13. **D** – Boundary – Line separating a system from its environment.
14. **A** – Environment – Things outside a system that affect it.
15. **A** – Feedback – Output information sent back to adjust the system.
16. **E** – Control – Checking output against goals and correcting.
17. **B** – Open system – System that interacts with its environment.
18. **C** – Closed system – System with no exchange with its environment.
19. **B** – Manmade system – System designed and built by people.
20. **D** – Subsystem – A smaller system inside a larger system.

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